

for a compositor's day's work. By an ingenious arrangement the workman can compose four different characters, Roman or Italic, without moving from his place.

Mr. Hammersley, of the Manchester School of Design, has a large picture illustrative of the principles by which the forms of nature are adapted to the purposes of the designer of textile fabrics and other flat surfaces. The work is in oil, and covers a surface of 195 square feet. The details, we are told, comprise a large oval centre, surrounded by a broad border, and occupied by a composition of fruit and flowers, painted in natural hues; a few accessories, harmonising in colour and character, filling in the remainder of the space. Around that centre there are drawn a series of geometrical forms, produced by circles intersecting each other at various points; and each space between two or more lines is occupied by some natural form adapted to the purposes of the designer for textile fabric; in each space a fresh design, and 237 in the aggregate.

Mr. Arnytage and Mr. Corbould exhibit pictures as specimens of new mediums. The "Medieval Court" where Messrs. Pugin, Hardman, Crace, Minton, and others, will co-operate to produce a homogeneous whole, is getting into shape. The foreign exhibitors will have an advantage in the arrangement of their stands, inasmuch as the works of each country may be placed so as best to assist each other; while, in the British department, the exhibitors will be unable to control their immediate neighbours. There will be no lack of organs and other musical instruments, some of which, we hope, will be brought into play. It is calculated that the total number of exhibitors will be about 15,000.*

We were sorry to see the Sappers employed in giving the admission tickets, and other matters of arrangement. The absence of the military on such occasions in England is as characteristic as their presence abroad, and it seems to us very undesirable, thus practically to contradict the impression which our continental neighbours correctly hold in this respect. The office with the red-coats and their officers occupying the desks (intelligent and efficient as they seem to be, certainly does not look English. At all events, we trust the executive will let them put on plain clothes, *pro tempore*.

The number of foreigners in London is already very noticeable in the streets. And we may here take the opportunity of replying, in a matter which arises out of this fact, to some of our correspondents, who seem to think that we are bound not merely to know every thing but to let them know it too. We can satisfy them that *ici on parle Français* is perfectly correct French, and that the placards in our shop windows need not be altered to "*ici on parle Français*." The authorities say that the words after which *l'on* should be used rather than *on* are *et, si, ou, que, and qui*. It must not be concluded from this that *ici l'on* may not be written: we may use either mode, according to whether the verb which follows

begins with a vowel or a consonant. It would be properly employed, for example, in the following inscription (for a cemetery). *Ici l'on est Français*. We repeat, however, that *ici on parle Français* is perfectly correct.

The formation of the juries by whom the prizes are to be awarded is a matter of considerable importance. The commissioners have determined that there shall be one jury to each of the thirty classes into which the Exhibition is divided. They have given to each class a jury varying in number from six to twelve, and making in the aggregate 370. Half of these are to be foreigners: and the commissioners have called upon the metropolitan committees, and the committees of those towns which exhibit to any considerable extent in any of the classes, to send a limited list of names of persons qualified and willing to act as jurors in the respective departments to which their position and knowledge recommend them. The commissioners say in their letter,—"As the satisfactory discharge of the duty of a juror in an International Exhibition involves the exercise of great practical skill, it is requested that you will represent to your committee the necessity of recommending persons who may obtain the confidence of the public." From these the commissioners will then select.

In the metropolitan section of Fine Arts the persons recommended are,—the chairman, Sir Moses Montefiore; the deputy chairman, Professor Cockerell, R.A.; Lord Ashburton, Mr. Alderman Salomons, Mr. Wyon, R.A., and Mr. Weekes.

In class 27, manufactures in mineral substances, used for building or decoration, Mr. W. Tite, Mr. Bunning, and Mr. George Godwin have been named: and in class 7 the jurors recommended are,—for civil engineering contrivances, Mr. W. Tierney Clark and Mr. Edwin Clark; for architectural and building contrivances, Mr. C. Fowler, and Mr. J. J. Scoles. The duties of the juries will demand much time and attention.

CAUSES AND CURE OF SMOKY CHIMNEYS.*

Deficient Supply of Air.—We have seen that the primary cause of action in chimneys is the rarefaction of air, which brings into operation the principle of gravitation: i.e., the column of air in the chimney being rendered lighter by rarefaction, the column of external air presses it upward at its base. A portion of this external air enters into the chimney at each instant of time with the smoke or gas from the fire, mixes with and becomes rarefied by it, and passes off into the atmosphere with it. Now, as fire-grates have been heretofore and are still constructed, it is an indispensable condition, that a certain portion of air must enter the chimney in this way in order to produce a sufficient current to carry off the large quantities of unconsumed carbonaceous matter, or smoke, which is generated. For although this smoke, as we have seen at page 530, vol. viii., is much lighter than atmospheric air and will naturally rise through it, it has also a natural tendency, in common with all gases, to diffuse itself to a certain extent in every direction; and therefore, although the bulk of the evolving gas from a fire in a perfectly close or air-tight room, would ascend the chimney by reason of its superior lightness, a portion of it would diffuse itself through the atmosphere of the room, or, in household parlance, the room would be "filled with smoke." To counteract this tendency a current of atmospheric air is necessary, of sufficient volume and velocity to absorb and carry off the smoke or gas as quickly as the fire can generate it.

The process of combustion also requires a constant supply of atmospheric air, as it is the oxygen contained in it which supports fire. Here then we have two distinct demands for a supply of unrefined atmospheric air.

An ordinary fire-grate with a 9-inch flue, and consuming about 28 lbs. of coal per diem, requires a constant supply of from 30 to 40 cubic feet of air per minute to supply the two demands above named, i.e. the current or "draught" of the chimney and the process of combustion. It matters not what may be the size of cubic contents of the room, whether 1,000 or 10,000 cubic feet, the requirements as regards a fire of the above proportions remain the same; and unless there be apertures or crevices sufficient to admit this quantity of air, the current in the chimney is impaired and the chimney "smokes." It is a most significant indication of the extent to which our present subject is understood amongst practical men, that even in dwelling-houses of the present day, as a general rule, chimneys are left to fortuitous circumstances for this essential supply of the means of proper action; and the air which ought to be admitted from the external atmosphere by proper inlet channels, equal in capacity to the outlet channel (i.e. the chimney), is compelled to make its way to the fire-grate through keyholes and crevices, or round doors and windows, and hence we hear of "draughty rooms," and we are constantly being warned by considerate friends against sitting in the "draught of the window" or the "draught of the door," as the case may be. Should these "draughts" be stopped by such familiar appliances as listing, sandbags, &c., we find that the chimney "smokes," and forthwith the "chimney doctor" is sent for to affix all manner of fantastic caps and cowls, and also to try sundry leagtheenings and shortening of zinc tubes at the top of the chimney; whereas the disorder lies at the bottom, in the want of a proper and sufficient supply of unrefined air to the fire-grate.

If proof were needed that this supply of atmospheric air is essential to the proper action of chimneys, it would only be necessary to direct attention to the innumerable chimneys that "smoke unless the door or window be set a little open;" or that "always smoke at first lighting," but cease to do so after several hours' firing. In the former case the crevices of the doors and windows before alluded to are altogether too small to admit a sufficient quantity of air at the requisite velocity; and in the latter case these crevices are large enough after the fire has had time to produce a high degree of rarefaction in the chimney, but not before. This will be obvious from the following reasoning, viz., when a fire is first lighted, its power of rarefaction is small, and the current or "draught" which it creates in the chimney is weak and sluggish, and is therefore unable to carry off the smoke with sufficient rapidity; but as the fire increases its power of rarefaction is increased also, and a greater difference is produced between the weight of the column of air in the chimney and that outside, and the velocity of the current is thereby increased. But the difference produced between the internal and the external columns of air by this rarefaction, as regards their relation to each other, amounts to a virtual increase of the pressure of the latter; and as the pressure of a fluid issuing through an orifice is increased, its velocity is increased also in certain proportions; and it therefore follows, that the velocity of the air entering through the crevices before mentioned, is increased as the rarefaction increases, until it arrives at an extent equal to the demand for the proper action of the chimney.

In support of this reasoning we may adduce a fact which is patent to all who have been plagued with "draughty rooms," viz., that when the fire is most powerful, the draughts are strongest. We may here remark that the remedy for this particular cause of "smoky chimneys" would also prove an effectual remedy for "draughty rooms," as all the draughts might be stopped with perfect impunity. Of this remedy we will have to speak in a future paper, and will now pass on to describe the third "cause" on our list.

* One of the exhibitors, Mr. M. Lachlan, decorator, had a specimen of antique colours on glass destroyed by the wind blowing it off the wall. A proposed exhibitor of painted pearls, for flooring, complains of the refusal of space. As we gather from his letter, however, that the local commissioners were not allowed to see his specimens when they called, he has only himself to blame in the matter. Mr. Caldecott, of Brompton, exhibits a fine specimen of English oak, in the shape of an elegant sideboard. Mr. Harrison has exhibited to us a handsome worked altar-cloth. As to the advertised auxiliary Exhibition building, there is no satisfactory information to be obtained.

* See p. 68, ante.